

## ABSTRACT

A carbon nanotube-based field emission device in accordance with the invention includes: a cathode electrode (50), a carbon nanotube array (40) formed perpendicularly on the cathode electrode, a barrier (20) and a gate electrode (60). The carbon nanotube array has a growth end (42) electrically contacting with the cathode electrode, and an opposite root end (44) for emitting electrons therefrom. The root end of the carbon nanotube array defines a substantially planar surface having a flatness of less than 1 micron.